CLAIMS

What is claimed is:

1. A mobile gas separator system for temporary use at the well site of a natural gas well following stimulation that produces dirty gas, the system comprising:

a mobile support adapted to be parked temporarily at the well site;

a gas separator mounted on the mobile support and adapted to remove selected contaminants from dirty natural gas to produce marketable gas;

a pretreatment assembly mounted on the mobile support, the pretreatment assembly being adapted to receive dirty gas from the gas well, to prepare the dirty gas for the gas separator, and to conduct the prepared dirty gas to the gas separator.

2. The system of claim 1 wherein the pretreatment assembly comprises a first separator is adapted to remove selected contaminants from the dirty gas.

3. The system of claim 2 wherein the first separator comprises a sand separator adapted to remove particulate matter from the dirty gas.

4. The system of claim 1 wherein the pretreatment assembly comprises a second separator adapted to remove small oil and water aerosols.

5. The system of claim 4 wherein the second separator comprises a coalescing filter.

6. The system of claim 1 wherein the pretreatment assembly comprises a heater adapted to adjust the temperature of the pretreatment dirty gas to a temperature suitable for the gas separator.

7. The system of claim 6 wherein the pretreatment assembly comprises a recirculating assembly to recirculate gas through the heater until the gas reaches a desired temperature.

8. The system of claim 7 wherein the recirculating assembly comprises a recirculating valve and a temperature sensor.

9. The system of claim 1 wherein the pretreatment assembly comprises a guard vessel adapted to remove oil and glycol vapors.

10. The system of claim 9 wherein the guard vessel comprises an activated carbon adsorbent.

11. The system of claim 9 wherein the pretreatment assembly comprises a polishing filter downstream of the guard vessel adapted to remove additional aerosols and particulate matter from the dirty pretreatment gas.

12. The system of claim 1 further comprising a hydraulic plant mounted on the mobile support to supply hydraulic power to the pretreatment assembly.

13. The system of claim 12 further comprising a generator mounted on the mobile support and adapted to power the hydraulic plant.

14. The system of claim 1 wherein the mobile support comprises a trailer adapted to be removably connected to a vehicle for transporting the system.

15. The system of claim 1 wherein the gas separator is a membrane separator.

16. The system of claim 15 wherein the membrane separator adapted to selectively reduce carbon dioxide, hydrogen sulfide and water content in the dirty gas.

17. The system of claim 16 wherein the membrane separator comprises cellulose acetate polymer membrane modules.

18. The system of claim 1 further comprising:

a heater adapted to adjust the temperature of the pretreatment dirty gas to a temperature suitable for the gas separator;

a hydraulic plant mounted on the mobile support to supply hydraulic power to the pretreatment assembly;

a generator mounted on the mobile support and adapted to power the hydraulic plant;

means to circulate dirty pretreatment gas to fuel the heater;

means to circulate post-treatment gas to fuel the heater;

means to recirculate pretreatment gas through the heater until the pretreatment gas reaches a desired temperature; and

means to selectively control the source of the gas used to drive the heater.

19. The system of claim 18 wherein the means to circulate dirty pretreatment gas and the means to circulate post-treatment gas comprise electro-hydraulically controlled valves.

20. The system of claim 1 further comprising a heat exchanger mounted on the mobile support and adapted to adjust the temperature of the post-treatment gas received from the gas separator to a marketable temperature.

21. The system of claim 1 further comprising means for maintaining the pressure of the post-treatment gas at a marketable level.

22. The system of claim 21 wherein the means for maintaining the pressure of the post-treatment gas at a marketable level is an adjustable choke.

23. The system of claim 1 further comprising a liquification unit adapted to receive the marketable gas and convert it to a liquid phase.

24. The system of claim 23 further comprising containers adapted to receive the liquefied marketable gas.

25. A method for processing dirty natural gas to produce marketable gas, the method comprising:

conducting dirty natural gas from a first gas well following stimulation to a mobile gas separation system at the well site of the first gas well; and

processing the dirty gas in the gas separation system to produce marketable gas.

26. The method of claim 25 further comprising:

during the processing step, testing the pre-processed dirty gas to determine marketability; and

terminating the processing step in response to a determination that the pre-processed dirty gas has become marketable.

27. The method of claim 25 wherein the processing step comprises removing carbon dioxide from the dirty gas.

28. The method of claim 27 wherein the removal of carbon dioxide is carried out using a gas separator.

29. The method of claim 28 wherein the gas separator is a membrane separator.

30. The method of claim 29 wherein the processing step comprises pretreating the gas prior to removing the carbon dioxide for the removal of particulate matter, free water, aerosols, condensates, oil and glycol vapors.

31. The method of claim 30 wherein the processing step comprises adjusting the temperature of treated gas to a marketable temperature.

32. The method of claim 26 further comprising, after terminating the processing step, removing the gas separation system from the first well site.

33. The method of claim 32 further comprising, after removing the gas separation system from the first well site, moving the gas separation system to the well site of a second gas well and repeating the method of claim 21.

34. The method of claim 25 comprising liquefying the marketable gas produced by the processing step.

35. The method of claim 34 comprising placing the liquefied marketable gas in containers at the well site.